

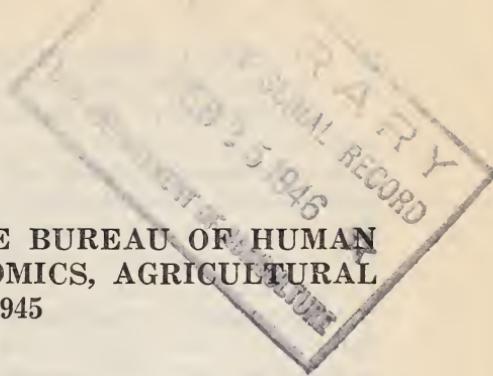
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REPORT OF THE CHIEF OF THE BUREAU OF HUMAN  
NUTRITION AND HOME ECONOMICS, AGRICULTURAL  
RESEARCH ADMINISTRATION, 1945



UNITED STATES DEPARTMENT OF AGRICULTURE,  
*Washington, D. C., September 15, 1945*

Mr. P. V. CARDON,  
*Agricultural Research Administrator.*

DEAR MR. CARDON: I submit herewith the report of the Bureau of Human Nutrition and Home Economics for the fiscal year ended June 30, 1945.

Sincerely,

HAZEL K. STIEBELING,  
*Chief.*

Produce, conserve, save, and share were watchwords on the home front throughout the last year of war, as from the start of hostilities. And while American families cooperated wholeheartedly in the war program, their thoughts turned with ever-increasing hope to the time when the Nation's vast creative energies could again be turned to producing for peaceful living and to bringing freedom from want for all.

The research program of the Bureau of Human Nutrition and Home Economics in 1944-45 reflected both the current needs of the Nation's families and their dreams for the future. Studies directed toward helping families adjust to the wartime situation were continued. Others looking to reconversion and the postwar period were begun.

In food and nutrition research, emphasis was placed on getting basic facts on nutritive values to guide choice making among the less well-known foods, on finding more effective methods of home food preservation, and on developing acceptable ways of preparing nutritious food in the light of wartime supplies. In textiles and clothing, major objectives were to help homemakers use as effectively as possible the reduced supplies of clothing and fabrics available to civilians and to establish new lines of research on consumer problems likely to arise immediately following the war.

In housing and household equipment, ground work was laid for a broad study of the housing needs and preferences of rural families and for basic studies of the operating characteristics and performance requirements of home equipment. Work on family economic problems was directed toward aiding families to use their resources wisely and toward assembling and analyzing data that relate to policy in food, housing, and other aspects of consumption.

## ADJUSTMENTS OF RURAL FAMILIES TO ECONOMIC CHANGE

A continuing function of the Bureau is the collection and interpretation of economic facts needed for improving levels of living in this country. A study of the effect of the war on the incomes and spending and saving practices of rural white families is in progress in cooperation with the University of Tennessee. Field work has been completed, providing information from 130 white rural nonfarm families in one county, and from 400 farm families in 17 counties, representative of Tennessee's white farm families. Somewhat more than 60 percent of these farm families were owner-operators and about a quarter were share tenants and sharecroppers.

First tabulations of results show that for the year 1944, a time when national income was at a very high level, nearly a fourth of the farm families surveyed had net money incomes under \$500 and approximately 55 percent had incomes under \$1,000. Only 6 percent reported incomes of \$3,000 or more. The median money income was \$900. In contrast to this figure, United States farm families in 1941 reported a median net money income of \$761.

How these Tennessee figures compare with current national data will be known as soon as the Department's report of farm families' gross income and farm expenses for 1945 becomes available from the quarterly survey of agriculture. Plans are being laid to get from the farm families providing these quarterly reports, facts also about their family expenditures for various goods and services. This will round out the picture of the flow of money to and away from farm families.

One major purpose in studies of expenditures of rural families is to discover relationships among and factors affecting expenditures for different purposes. The resulting generalizations are useful in developing educational programs for families, and as a basis for making recommendations for administrative programs to improve rural living.

Despite wartime shortages of building materials, expenditures in 1944 for housing improvement, repairs, and replacements by Tennessee farm families averaged \$35, and were not greatly different from expenditures of families having about the same money incomes in earlier years. In 1941, farm families in the United States spent an average of \$29. For families with incomes below \$1,000, the 1944 Tennessee average was \$18; for those with incomes above \$2,000, \$128. About 10 percent of the Tennessee families reported expenditures for housing improvements and 22 percent for repairs and replacements. These are about the same percentages as reported such expenditures for the United States as a whole in 1941.

Data on 1941 expenditures for living have been analyzed further during the past year to ascertain the effect of family size on patterns of consumption. Farm families, it was found, increased their total expenditures for food but little as number of family members increased, but they markedly increased their home food production. In each income group under \$1,000, expenditures for food and shelter ranked first and second in importance for two- and three-member families, but among families with four members, clothing rather than shelter came second in importance.

For every income group the percentage spent for housing decreased with family size, whereas the percentage for clothing increased. For families of every size, expenditures in successively higher income brackets increased relatively more for shelter and automobile than for any other items.

### INCOME, FOOD CONSUMPTION, AND DIETARY ADEQUACY

Various plans for assuring more effective distribution of food to improve nutrition, to promote full use of agricultural resources, and to provide adequate outlets for food supplies are now being formulated for possible postwar use. The Bureau has analyzed data on hand and has made new studies to assist in the Department's analysis of such proposals. Special attention was given to possible effects on diets of people in this country and on national demand for various foods.

It is well known that size of family as well as size of income determines how much urban families spend for food. A special analysis of data collected in 1941 shows that urban families with money incomes of less than \$260 per person per year spent on the average more than half of their income for food. Only when the year's income exceeded \$410 per person did the proportion fall below 40 percent. The annual per capita cost of food under the Bureau's low-cost plan was \$140 in the spring of 1942 if valued at the average retail prices paid by urban families with incomes under \$1,500. An addition of 20 percent to take care of differences in food habits and knowledge about economy in food purchases among families would bring it to \$170.

With incomes as they were in the spring of 1942, only by allotting more than 40 percent to food could some 5.4 million urban households, about one-fifth of the urban population, spend as much as \$170 per person per year for food. It is estimated that such a level of expenditure would have increased their demand for tomatoes and citrus fruit by 60 percent; for milk and its products, by 30 percent; and for meat, poultry, and fish, by 30 percent. It should be noted, however, that nutritionally adequate diets well within the general pattern of American food habits could have been bought for about 20 percent less, had families been willing to follow closely the Bureau's low-cost food plan.

Studies of food consumption of farm families in a county in Georgia and one in Ohio are now in progress. These are designed to show the relation of net money income and farm-furnished food to food purchases and dietary adequacy during this period of relatively high incomes. For comparison, an analysis is being made of similar data secured in 1935-36.

### NUTRITIVE VALUE OF CIVILIAN FOOD SUPPLY

As a service to consumers as well as to Government agencies concerned with production and distribution of the Nation's food, estimates of the nutritive value of the per capita civilian supply continue to be made periodically.

Studies made during 1945 indicated that the anticipated supply of food for civilians for the year would be generally above the prewar level, although somewhat below that of 1944. The improvement for 1945 as compared to 1935-39 will be due in part to a 29-percent increase

in the fluid-milk supply. This accounts for a 20-percent increase over the prewar period in the calcium content of the national food supply for civilians and also a generous contribution of protein to the diet. Chiefly to this larger supply of milk and to the enrichment of bread and flour can be traced the increase of about a third in the per capita supply of riboflavin.

Largely as a result of the enrichment of grain products, the 1945 food supply will provide about a third or more iron, niacin, and thiamine than in 1935-39. Increased supplies of citrus fruit, tomatoes, and green and yellow vegetables in 1945, as compared with prewar years, will provide about 20 percent more vitamin A and ascorbic acid. Compared with those in 1944, food supplies in 1945 will provide about 5 percent less thiamine, largely because of smaller quantities of pork. Some cut in supplies of sugar, fats and oils, and meats may bring 5 percent fewer calories, unless people eat more grain products.

### FAMILY FOOD PLANS

Family food plans at two cost levels have been priced quarterly, using average retail city prices as reported by the United States Bureau of Labor Statistics. Very little change in cost occurred during the past year. It was estimated that a low-cost nutritionally satisfactory diet for a family of two could have been bought for \$7 to \$8 a week at average city prices in March 1945. For a family of four, it would have taken \$12 to \$13; and for a family of seven, \$19 to \$22. At a moderate-cost level, corresponding figures were \$10 to \$12, \$16 to \$18, and \$26 to \$29 for families of two, four, and seven persons.

To help the young married couple, particularly the men and women now being released from the armed services who are setting up house-keeping for the first time, a popular folder called Food for Two (AIS-21) was issued. This gives a moderate and low-cost food plan, with a suggested market list and menus for a week. It shows how money for food may be spent to advantage nutritionally and the table furnished with meals acceptable both to eye and appetite.

### RESEARCH ON NUTRITIVE VALUES OF FOODS

Though shortage of the best liked protein-rich foods will ease with end of the war, there remains the continuing problem of providing high-quality protein for low-cost diets both here and abroad. Basic to this is more exact knowledge of the amino acid content of the various plant proteins. As a supplement to earlier work on soybeans, peanuts, and cottonseed, the protein values of wheat germ and corn germ were studied extensively this past year.

Wheat germ was found to stand foremost among these plant foods as a source of nutritionally efficient protein. Corn germ, though ranking below wheat germ, was better than the peanut or soybean flours previously studied. However, the quality of the protein in both cereal products proved inferior to that in egg or in milk when fed at a 15-percent or higher protein level in a diet adequate with respect to all other nutrients.

The potential annual production of wheat germ is estimated to be about 150 million pounds, and of dry corn germ, 600 million pounds.

Present production is far below such levels and most of the supply is now used for animal feed. If marketed in a form suitable for human consumption, these cereal-grain germs could become a source of high-quality food protein at relatively low cost.

In pushing further the search for rapid chemical methods of determining amino acids in proteins, a satisfactory colorimetric procedure was developed for methionine, which is one of the amino acids essential for growth in the young and for maintenance of good nutrition in adults. By use of this new method, methionine determinations were made on a selected list of plant foods important as possible supplements to protein foods from animal sources. One interesting discovery was that the Brazil nut contains more methionine than is recorded for any other food.

Another contribution to knowledge of nutritive values in food is recently completed tables giving the composition of 275 common foods in terms of 11 nutrients. These new figures, covering protein, fat, carbohydrate, iron, phosphorus, calcium, and five nutritionally important vitamins, include many new data obtained from laboratories the country over, through cooperation with the Committee on Food Composition of the Food and Nutrition Board of the National Research Council. Like the now world-famous tables of food composition published by the Department of Agriculture 50 years ago, these new tables are basic to the calculation of the nutritive value of diets for either civilian or military purposes and to planning food production and distribution to meet human needs.

A summary of the nutritive values of vegetables cooked in large quantities, made in response to a request from the Quartermaster General's Office, was published. The wide range found for both the vitamin content and the percentage retained in vegetables as prepared in the Army mess and other institutional kitchens points to the need for additional research on methods of reducing losses in large-quantity cooking.

### VITAMIN A AND CAROTENE

Throughout the world a large proportion of the needed vitamin A is furnished by plant foods in the form of carotenes which the body can transform into vitamin A. Many of the factors affecting the utilization of carotene are far from understood. For example, work in the Bureau's laboratories showed that the carotene in cooked kale is utilized better by the body than the carotene in cooked carrots. Investigations were undertaken to explain the discrepancy, if possible—whether it is due to the higher vitamin E content of leaves as compared to roots, or to a difference in the way carotene is held in cellular structure, or to some other cause. To determine the role of vitamin E in carotene utilization, vitamin E-deficient and vitamin A-deficient animals were fed various amounts of vitamin E along with none or adequate amounts of carotene. Provision of vitamin E was found to delay the appearance of sore eyes and death of animals on a vitamin A-free diet and, when given along with generous amounts of carotene, seemed to improve the vitamin A stores of the liver, although it had no effect upon growth rate. Work on this subject is continuing.

Even though the carotene in cooked kale was better utilized than that in cooked carrots, yet the vitamin A value of cooked kale, as determined by feeding experiments with the vegetable itself, appeared

to be only about two-thirds as great as would be expected from a chemical determination of its carotene content. However, when an extract of the carotinoid pigments from kale was fed as the source of carotene rather than the kale itself, the bio-assay gave a vitamin A value that agreed with the chemical assay. This indicates that in kale, at least, the difference between the chemical and biological assay is due to incomplete digestion of the vegetable and consequent incomplete absorption of carotene from the intestinal tract. Similar experimentation will be undertaken with other carotene-rich cooked fruits and vegetables and their extracts.

An important byproduct of this research on carotene utilization was the discovery of the inadequacy of the U. S. P. reference cod-liver oil as a standard in vitamin A bio-assays. A report of this work has stimulated investigation in several other laboratories, and at the recommendation of the United States Pharmacopoeia Vitamin Advisory Board new substances are being sought to be used as a vitamin A standard in the place of the U. S. P. reference cod-liver oil.

#### DRIED EGGS FOR THE POSTWAR MARKET

Whether the manufacture of dried eggs will continue after the war only for commercial and institutional use, or whether dried eggs will become a staple product in the American home kitchen and so serve to equalize the egg supply the year around—are now open questions. In either case, how well the dried eggs maintain their quality during storage is important. Much of the adverse comment on this product coming from servicemen can be traced to the unfavorable conditions under which supplies have had to be shipped, stored, and cooked. In cooperation with the Bureau of Animal Industry and the War Food Administration, studies on dried eggs have been continued, especially with a view to their postwar use.

Spray-dried eggs, to which different concentrations of sucrose, lactose, invert sugar, and dextrin were added before dehydration, were used in a series of cooking and palatability tests before and after storage at 100° F., a condition which would accelerate deterioration. In the initial tests, all treatments resulted in satisfactory pop-overs and baked custards, but were not palatable as scrambled egg. For making spongecakes, dried egg with 20 percent sucrose gave superior result; 10 percent sucrose and 10 percent lactose, fair; whereas, dried egg with invert sugar and dextrin and untreated egg were very poor. As measured by each criterion for cooking quality used, initial qualities were retained up to 8 weeks' storage at 100° F. by eggs incorporating 10 percent lactose. In contrast, untreated spray-dried egg deteriorated in less than 1 week. These findings suggest long storage possibilities for lactose-treated eggs held at lower temperatures. Incorporation of 20 percent sucrose prevented deterioration up to 8 weeks, except in baking quality as measured by the volume of pop-overs; loss of foaming power occurred between 8 and 16 weeks in storage. Addition to the egg of dextrin and invert sugar prolonged storage life very little with respect to cooking quality in general.

The relationship of flavor and cooking quality of the dried egg to such chemical properties as fluorescence and solubility was studied, in cooperation with the Bureau of Animal Industry. Deterioration in flavor and in cooking qualities in pop-overs was found to be accompanied by an increase in fluorescence and, in general, decrease in

solubility was related to poorer cooking quality. No measurable change in solubility occurred in the egg samples treated with 10 percent lactose and 20 percent sucrose through 8 weeks' storage at 100° F., and these samples also gave the best results in cooking.

To aid in a proposed consumer-acceptance test of dried eggs in the retail market, an illustrated recipe booklet (Cooking with Dried Eggs, AIS-28) was prepared. This gives directions for reconstituting dried whole egg, dried egg yolk, and dried egg white and includes about 45 recipes for a wide variety of dishes.

### HOME FOOD PRESERVATION

Nearly half of the 1944 civilian supply of canned vegetables and two-thirds of the canned fruits were provided during the third year of the war by the efforts of some 25 million families again united in a national home food-preservation program. The total pack from home kitchens and community canneries was estimated to be almost 3½ billion quarts. All of this was accomplished despite continued problems with processing techniques and equipment.

Since home canning figures importantly in the farm family's home food-production program in time of peace as well as of war, the Bureau is continuing to push forward its research in home canning. Systematic study is being made on all the commonly canned fruits and vegetables to determine the effect of method of preparation, pretreatment, packing, and kind of equipment on the rate of heat penetration and other factors affecting processing time and temperature. The aim is to develop simplified procedures which will safeguard against spoilage and conserve nutritive value and flavor. The Massachusetts Agricultural Experiment Station and the University of Texas are cooperating in this research.

Studies on the home freezing of fruits and vegetables also are directed toward finding the best ways of pretreating and packaging foods to retain color, flavor, texture, and nutritive value. The retention of these qualities is being carefully checked in relation to length of storage time.

Considerable work was done on 10 different vegetables and fruits and preliminary work on 5 others that present different problems in home freezing of foods. The following results with peaches show the value of carefully controlled experiments in obtaining high-quality home-frozen products. Packing peaches in 40-percent sugar sirup was found to be more satisfactory than packing in dry sugar for retaining natural flavor and ascorbic acid (vitamin C). To prevent discoloration, a major problem with this fruit, five antidarkening agents were tried. Results after storage showed that of the 5 pretreatments, those with ascorbic acid and citric acid were most effective for practical purposes. For home freezing of peaches a citric acid dip or the addition of ascorbic acid to the pack is being recommended; the latter is more expensive, but adds to the nutritive value.

To give homemakers the results of laboratory research, an illustrated how-to-do-it publication on home freezing of fruits and vegetables is being prepared. The techniques described for preparing foods for freezing are equally applicable whether the food is frozen in a home cabinet or taken to the community freezer-locker plant. For group teaching, a motion picture film in technicolor is also in production.

As another aid to the family desiring frozen-fruit products, the formula for making Velva Fruit commercially, developed by the Western Regional Research Laboratory, was adapted for home use and published in an illustrated leaflet (Making Velva Fruit at Home, AIS-22).

### EQUIPMENT FOR HOME FREEZING

Many urban and rural families expect to buy home freezers after the war and are asking what construction features to look for in purchasing this type of equipment. War Production Board records early in 1945 showed that more than 70 companies had applied for materials to manufacture home freezers, and manufacturers, too, are asking for advice on ways of designing their product in order more closely to suit consumer needs. To help meet demands of both of these groups, the performance of 6 home freezers of different constructions is being studied in detail.

It is common knowledge that 0° F. is a satisfactory storage temperature from the standpoint of maintaining quality of frozen foods and economy of operation of the refrigeration equipment. Observation of the performance of the 6 home freezers showed, however, that changes in construction design are needed in order to provide and maintain efficiently a temperature of 0° F. or lower throughout the storage space. In the 6 freezers studied, temperature differences between the top and bottom of the storage space ranged from 15° to 35° F., with the greatest difference occurring between the lid and horizontal plane at the highest level of refrigerant plates, or tubes. With thermostats set to maintain a temperature of 0° F. in this plane, as now suggested by a number of manufacturers, an average of about 10 percent of the storage space in the cabinets tested was considerably above recommended storage temperatures.

The freezers studied had about the same thickness of insulation, and no appreciable difference in energy consumption per cubic foot per 24 hours was observed. About 90 percent of the electrical energy used in operating the cabinets under home conditions was required for maintaining storage temperatures, whereas about 10 percent was used for freezing and for lowering the air temperature after opening the lids.

Families owning home freezers will face a problem if ever they encounter an extended period of nonoperation of the freezer due to circumstances such as power outage in the supply line, damages to the house circuit, or mechanical failure in the compressor unit. Because of the possibility of spoilage, it is important to know what happens to the temperature of stored frozen food during a period of nonoperation.

Studies with five chest-type freezers show that after interruption in operation the length of time for frozen food to warm to 32° F. varies with the construction of the freezer and with the amount and position of food in the freezer. Different kinds of frozen foods packaged in the same-size containers and stored at the same level adjacent to each other were found to warm in approximately the same time.

Different freezers, fully loaded with frozen foods, varied in the length of time they kept all packages below 32° F. after interruption of current. They varied by as much as 36 hours, but all fully loaded freezers held all packages below 32° for at least 44 hours. When the

cabinet was fully loaded, food stayed below 32° for 69 hours longer than food in the same position when the freezer held only a quarter load. Foods in some positions in a fully-loaded freezer warmed to 32° 58 hours before food in other positions. In general, the length of time for packages to reach 32° increased in the order given for locations: (1) The top layer of the freezing compartment; (2) the top layer of the storage compartment; (3) the bottom layer of the freezing compartment; (4) the layer against the sides of the storage compartment; (5) the bottom layer of the storage compartment.

For the freezers studied, this work shows a need for better insulated tops and lids and better insulation between compressor unit and freezing compartment. It also affords an illustration of the necessity for developing performance standards for temperature-holding capacity during periods of nonoperation. These should be based both on bacteriological and food-quality studies.

### TEXTILES AND CLOTHING IN WARTIME

Because of the need for consumer information on the relative utility and quality of fabrics currently on the market, nearly 600 samples of staple clothing fabrics from 15 cities of various sizes located in 5 sections of the United States were examined during the past year. This has been accomplished in the Bureau's laboratories and through cooperative projects established with experiment stations and schools of home economics in Minnesota, Pennsylvania, Tennessee, and Washington. The supply of these fabrics in the smaller cities and towns was found to be meager in all the localities sampled; serviceable cotton goods were practically nonexistent. Staple cotton fabrics were scarcer than rayon, and the cotton materials available were coarse and sleazy and prices were high in relation to quality. Less information concerning fiber content, colorfastness, and shrinkage was obtainable from salespersons or from labels in the spring of 1945 than in the fall of 1944.

Laboratory study of the quality of these fabrics, including shrinkage, colorfastness, and breaking strength, will be of value in determining the fabric properties necessary in different qualities of staple textile materials, as well as disclosing current trends in fabric quality. It also will be useful in preparing buying guides which, as normal market conditions return, will assist consumers in selecting fabrics well adapted to their needs.

Owing to the increased need for home sewing brought about by wartime scarcity of materials and of factory workers for clothing production, special emphasis has been placed on the preparation of sewing aids that will help the home dressmaker produce garments of high professional quality. Two earlier bulletins on clothing construction—*Coat Making at Home* (Farmers' Bulletin No. 1894) and *Making a Dress at Home* (Farmers' Bulletin No. 1954)—were recently supplemented by additional publications—*Fitting Dresses* (Farmers' Bulletin No. 1964) and *Pattern Alteration* (Farmers' Bulletin No. 1968). New publications on remodeling coats and suits, and renovating, cutting, and seaming discarded knitted materials for remaking into garments were prepared. These bring to a total of 13 the mimeographed and printed publications on textiles and clothing conservation issued since the outbreak of the war.

### SERVICEABILITY STUDIES ON HOUSEHOLD FABRICS

An investigation comparing 33 prewar plain curtain marquisettes, when new and during service, was completed during the past year. Of all-cotton materials only those made from fine, single yarns were included, since an extensive survey of the market showed that this type predominated among the plain marquisette curtainings available to homemakers.

This research showed that, in general, the period of usefulness for most of these marquisettes was comparatively short—2 years or less—and that the amount of shrinkage was high. However, if for any reason the consumer prefers cotton marquisette to other types of glass-curtain materials, those fabrics made of highly twisted yarns and having the largest number of yarns to the inch—at least 50 in the warp and 25 in the filling—will withstand wear better than similar materials having fewer, less tightly twisted, coarser yarns. Of the marquisettes containing rayon in both directions, those having 40 or more continuous filament yarns with considerable twist in the warp and at least 25 like yarns in the filling, wore better than fabrics having fewer warp and filling yarns with little or no twist in the respective directions. Likewise, of the marquisettes having rayon only in the filling, those with continuous filament yarns gave better service than those with a spun rayon filling.

A comparison of two of the most commonly used upholstery materials—cotton tapestry and cotton damask—showed the former to be the better choice when serviceability is of primary importance. On the whole, the damasks lost a higher percentage of their breaking strength during abrasion than did the tapestries. A high number of yarns per inch in an upholstery fabric does not necessarily guarantee satisfactory service, although it may add substantially to the cost of the fabric. Price is an unreliable criterion of quality, the study showed.

### COTTON FABRIC UTILIZATION

As part of an investigation looking toward the development of textiles for specific uses, a study comparing various physical properties of cotton fabrics knitted from natural and mercerized carded and combed yarns was completed. This showed that knitted fabrics, like woven materials, are stronger when made from combed than from comparable carded yarns. But contrary to popular belief, it was found that although the mercerized yarns were as strong as or stronger than the corresponding natural yarns, knitted fabrics made from the mercerized were weaker and generally less resistant to abrasion than those made from the natural. The fabrics knit from mercerized yarns were less elastic than those made from the corresponding natural yarns.

Because of the inadequate supply of plied yarns for civilian textiles resulting from the enormous military demand for this type of yarn, investigations were continued on improving single yarns by means of chemical treatments. Many additive finishes—those which adhere mechanically to yarns but do not react chemically with cellulose—were studied. These finishes include gums, starches, waxes, resins, and glues of various types and in various solvents. The finishes were applied experimentally to 40's combed yarn, in various proportions (both

alone and with additions of softening agents) at various temperatures, and for different periods of time.

Several of these finishes were found to improve the appearance and some of the physical properties of the treated yarns and the fabrics knit from them. For example, hosiery fabrics knit from yarns treated with glue and formaldehyde were improved in appearance, bursting strength, and resistance to abrasion. Some of the acrylate resins improved the appearance, elastic properties, and resistance to rubbing of the knitted fabrics. Methylcellulose and gelatin with formaldehyde increased their elasticity. By using yarns in which the physical properties were improved by a chemical treatment, more satisfactory knit products have been made than was possible with untreated yarns. This work demonstrates ways in which single cotton yarns can be utilized to advantage.

### MAKING HOUSEHOLD COTTONS MILDEW-RESISTANT

Research on chemical finishes for rendering household textiles resistant to mildew has been continued in order to determine the permanence of such treatments under various weathering and storage conditions. Inasmuch as the susceptibility of untreated cotton fabrics to mildewing is a serious deterrent to their use in outdoor house furnishings, this work has important implications for the postwar utilization of cotton.

Preliminary tests were made to develop techniques and to establish experimental limits for studying the effect of different storage conditions on the deterioration of such textiles. It was found that untreated fabric, unsterilized and inoculated with natural inoculum (derived from soil) did not deteriorate appreciably when held at 30° C. with 7.4 percent moisture in the fabric for as long as 16 weeks. On the other hand, untreated strips, some previously wet with water and others wet with mineral salts culture medium, held at 30° with 16 to 20 percent moisture in the fabric lost 44 and 62 percent of their strength, respectively, in 8 weeks. Sterilized untreated fabric did not lose strength when stored under these conditions for 16 weeks.

### STANDARDS FOR CLOTHING CONSTRUCTION AND SIZING

Techniques of measuring and recording dimensions and contours of the foot believed to be most pertinent to the shaping, sizing, and fitting of shoes are being further explored. Measurements have now been made of the feet of 114 United States Army enlisted men who were stationed at the Walter Reed Reconditioning Section near Beltsville, Md., and of 50 civilian women. The data have been analyzed statistically with a view to establishing standards for the reliability of measurements needed in this pioneer field of research.

In research on the relative merits of various kinds of clothing construction, a machine was devised by means of which the resistance to abrasion of buttonholes made in different ways can be accurately compared. Progress also has been made in the development of a method for testing the comparative durability of different kinds of seams. These developments are steps toward the systematic formulation of definite standards for workmanship on clothing and for garment construction details. Such standards will provide the basis for devel-

oping specifications for clothing of different levels of quality. This ultimately will aid consumers in buying clothing.

Standards for workmanship and construction features for inexpensive ready-to-wear clothes will be of special interest to rural women. An analysis of the spending habits of rural families in 1941 showed that almost half of the women bought cotton dresses for house or street wear, about two-thirds bought rayon dresses, and one-eighth bought wool. The price most frequently paid for cotton dresses was \$1; for rayon \$5. The women buying cotton house dresses bought 3.0 on the average; those buying cotton street dresses, 2.4. As incomes increased, the number of dresses purchased increased somewhat, but the average price paid increased at an even greater rate.

### DISSEMINATING RESULTS OF RESEARCH

The Bureau has played an increasingly active role in the life of this country during the two decades of its existence. One measure of its influence and usefulness is the number of publications issued. The distribution (by request only) of those printed and distributed by the Government is shown below:

Period (fiscal year):	<i>Publications per year (research and popular) <sup>1</sup></i>	<i>Average yearly distribution of GPO-printed bulletins</i>
	<i>Number</i>	<i>Number</i>
1923-37-----	35	1, 585, 200
1938-41-----	51	2, 802, 900
1942-44-----	58	17, 363, 400

<sup>1</sup> Includes bulletins printed at the Government Printing Office (GPO) and articles in outside journals.

During the year July 1, 1944, to June 30, 1945, the Bureau released the following: 16 printed bulletins, 18 processed publications, 25 technical articles for professional journals, 140 popular articles for press or magazine use; 48 radio broadcasts on Nation-wide networks and 8 scripts for syndication; 4 film strips on home food preservation.

The Government's Nation-wide programs dealing with home food preservation, nutrition, use of abundant foods and stretching of those in short supply, clothing conservation, and various other problems on the home front, again called for speedy interpretation of the Bureau's research findings. These have gone out in popular bulletins, press and radio releases, and picture material for print and screen. One feature of the year's work was the joint production with the War Food Administration of a motion-picture film entitled "The Man Who Missed His Breakfast," for use in the 1944-45 nutrition program.

Close study is being made of format of popular bulletins and use of words from the readability standpoint, and preliminary plans have been made for a study of the effectiveness of various types of material with different age groups. These home economics bulletins contain facts of help in everyday living, and the goal is to present these facts so that they can be put to practical use by any one of the Nation's families.

U. S. GOVERNMENT PRINTING OFFICE: 1945